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DATA ON RIVER PASSENGER SHIPS BUILT BY GDR SHIPYARD FOR USE ON VOLGA AND DON RIVERS

Schiffbautechnik
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In 1953, the VEB state shipyard in Rothensee built and delivered to the USSR the first all-welded river passenger ships. The ships were built to specifications laid down in the Soviet Register for River Shipping for class "O" I. The ships were built under the supervision of DSRK (Deutsche Schiffsrevision und Klassifikation, German Ship Inspection and Classification Office). Specifications are as follows:

1. General

Passenger ship for inland waterways
Raised-deck type with continuous superstructure
Class I * O
Speed of 10.8 knots, corresponding to 5.55 meters per second
Cruising range of 520 nautical miles
Provisioned for 48 hours

2. Principal Measurements

Over-all length, 42.15 meters
Molded breadth, 6.70 meters
Registered breadth, 7.10 meters
Length between perpendiculars, 38.70 meters
Designed draft, 1.50 meters
Draft measured at 0.5 L [perpendicular?], 1.33 meters
Draft aft, 1.40 meters
Draft forward, 1.25 meters
Height to main deck level (Gurtungsdeck), 2.50 meters
Designed displacement, 194 cubic meters
Main frame area, 7.34 square meters
Designed water-line area, 189 square meters
Light tonnage, 138.75 tons

3. Dimensional Ratios

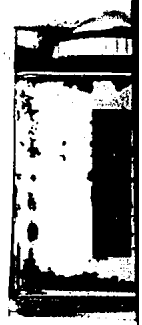
Length to breadth, 5.76
Length to depth, 15.50
Breadth to draft, 4.46

4. Coefficients

Alpha, 0.776
Beta, 0.810
Delta, 0.516
Phi, 0.637

5. Passenger Space

Sleeping quarters for 32 persons below deck
Upholstered seats for 58 persons above deck
Nonupholstered seats for 73 persons above deck



6. Crew and Passengers

Officers, 2
Crew, 6
Service personnel, 2
Passengers, 163
Total crew and passenger capacity, 173

In working up plans for the ships, a yachtlike over-all appearance was chosen. Frames sloping outward and a round bilge were decided on for the main frames, the bow has a pronounced flare, and the garboard strake ends in deadwood to give the ship greater stability.

The ships are of transverse-frame construction in which open-hearth steel has been used in accordance with specifications and tests of DSRK. The distance between frames is 600 millimeters. Intermediate frames are built between frames 55 and 64 in the forward part of the ship. The bulkheads consist of 4-, 5-, and 6-millimeter plate with 75- by 50- by 5-millimeter stiffeners. Bulkheads are located at frames 6, 12, 22, 28, 36, 40, and 59. Frame angle-bar scantlings measure 60 by 60 by 6 millimeters. This type was already being manufactured by GDR rolling mills.

The engine room is located amidships, with the radio room directly overhead on the deck above. The radio room is equipped only for transmitting. Four 2-man and six 4-man cabins for passengers are located between frames 12 and 22 below the main deck. Water closets are located on the quarter deck with a septic tank beneath. To empty the septic tank the ship must put in to home port, where a special craft takes care of this task. The tank can be cleaned out with the fire hose. Life-saving equipment includes two hydronalium lifeboats, located port and starboard on the quarter deck, and two life rafts.

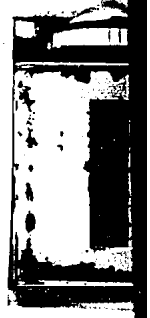
The ship is equipped with a 100-kilogram tripping stockless stern anchor and two 250-kilogram tripping stockless bow anchors. Hand windlasses operate the anchors.

To reduce weight, the deckhouses are made of hydronalium aluminum-magnesium 3 and the wheelhouse of hydronalium aluminum-magnesium 5. The shell plating is 2.5 millimeters thick and the deck plating, 1.5 millimeters.

In accordance with the request of the USSR that the engines be remotely controlled from the bridge, control levers for the injection pump and the reversing mechanism are located in the wheelhouse. The two balanced rudders are controlled from the bridge by means of rod gearing, with bevel gears at the turning points. This steering system is also equipped with a universal joint. Self-aligning roller bearings are used in the upper seating of the rudders.

In the rudder head itself there are friction bearings and regular stuffing boxes. The reduction gear from the wheel to the rudder has a ratio of one to 100. To turn 35 degrees to either port or starboard requires 11 turns of the wheel. The 1.5-square-meter rudders permit excellent maneuverability, as shown in trial runs.

A speaking tube and a sound-powered telephone system connect the bridge with the engine room. The loud-speaker system permits commands to be given from the bridge to crew or passengers on deck. Among additional equipment on deck is one 200-watt searchlight mounted atop the wheelhouse and two 100-watt searchlights atop the forward deckhouse.



In general, aluminum foil was used to insulate the ship. In addition, on special request of the USSR, the entire engine room was soundproofed. In the first ship built, this was done by cementing cork sheets to the outer plating, while in subsequent ships aluminum wool (Aluminiumwolle) was used. The main engines are seated on rubber mountings, to increase the soundproofing and to reduce the vibration. Rubber couplings to the shaft were installed.

The diesel motors requested by the USSR deliver 150 horsepower at 1,500 shaft rpm with a reverse-reduction gear ratio of one to three. Also, in accord with wishes of the USSR, the exhaust pipe is located below the water line and is equipped with a nonreturn valve.

Two different methods of shaft installation were tried:

In the first ship, the thrust bearing was placed directly on the tail shaft. A self-aligning roller bearing was used as thrust bearing. A thermometer installed in the machine room permitted remote observation of the temperature of the lubricant in the thrust bearing. A rubber coupling connected the tail shaft with the pinion shaft and another rubber coupling connected the pinion shaft with the main engine. The bearings for the pinion shaft were also self-aligning roller bearings set in vibration-dampening mountings. The tail shaft was seated in the tail-shaft pipe with rubber bushings, vulcanized into bronze bushings. The play between the tail shaft and the rubber bushings was limited to 0.3 millimeter. The bushings were water-lubricated with water from the water-cooling system of the main engine.

In the second ship built, following the wishes of the USSR, a different method was used. In this case, the thrust bearing was located in the engine room. The roller bearings functioning as the pinion-shaft bearings were rigidly fixed. A short pinion shaft with rubber shaft couplings at either end connected the shafting with the engine. The first method, however, proved to be best, resulting in vibration-free operation.

The ship's lighting is a 24-volt lead storage battery system. Generators hooked up to the two main engines and a shaft generator charge the batteries. A reserve generator can be operated by a polyphase induction motor when the ship is in port.

Testing of the ship showed that the shipyard met all the requirements specified. In fact, by means of careful saving on extra weight, the ship's draft was reduced by 5 centimeters. Representatives of the USSR inspected the ship and gave their approval.

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